CLAIMS

1. An optical sheet having cylindrical lens elements which have a high-order aspheric face and are provided successively in a row on one of principal faces of said optical sheet, characterized in that,

where a Z axis is taken in parallel to a normal line direction to said optical sheet and an X axis is taken in a direction of the row of said cylindrical lens elements, a cross sectional shape of said cylindrical lenses satisfies the following expression:

$$Z = X^2/(R + \sqrt{}(R^2 - (1 + K)X^2)) + AX^4 + BX^5 + CX^6 + \cdots$$

(where R is the radius of curvature of a distal end vertex, K is a conic constant, and A, B, C, ⋯ are aspheric coefficients.)

2. The optical sheet according to claim 1, characterized in that the radius R of curvature, the conic constant K and the aspheric coefficients A, B, C, ⋯ satisfy the following numerical ranges:

$R \geqq 0$

$K < -1$

$0 < A < 10^{-3}$

$0 \leqq B, C \cdots < 10^{-3}$

3. The optical sheet according to claim 1,

characterized in that the radius R of curvature, the conic constant K and the aspheric coefficients A, B, C, … satisfy the following numerical ranges:

$0 < R \leqq 72$

$-15 < K \leqq -1$

$R - K \geqq 5$

$0 \leqq A, B, C \cdots < 10^{-3}$

4. The optical sheet according to claim 1, characterized in that the radius R of curvature, the conic constant K and the aspheric coefficients A, B, C, … satisfy the following numerical ranges:

$0 < R \leqq 30$

$-15 < K \leqq -1$

$R - K \geqq 5$

$0 \leqq A, B, C \cdots < 10^{-3}$

5. The optical sheet according to claim 1, characterized in that convex portions having a height equal to or greater than 0.20 μm from an average central plane are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

the density of said convex portions is equal to or higher than 70 $/mm^2$ but equal to or lower than 500 $/mm^2$.

6. The optical sheet according to claim 1,

characterized in that convex portions having a height equal to or greater than 0.20 μm from an average central plane are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

the average distance between said convex portions is equal to or greater than 50 μm but equal to or smaller than 120 μm.

7. The optical sheet according to claim 1, characterized in that convex portions are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

said convex portions are provided such that, in a state wherein said cylindrical lens elements are not formed, the cloudiness degree of said optical sheet is equal to or lower than 60%.

8. The optical sheet according to claim 1, characterized in that convex portions are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

said convex portions are provided such that, in a state wherein said cylindrical lens elements are not

formed, the cloudiness degree of said optical sheet is equal to or lower than 20%.

9. The optical sheet according to claim 1, characterized in that convex portions are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

the ten-point average roughness SRz of said convex portions is equal to or higher than 1 μm but equal to or lower than 15 μm.

10. The optical sheet according to claim 1, characterized in that convex portions are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

the height of said convex portions at which the convex portion area occupies 1% is equal to or greater than 1 μm but equal to or smaller than 7 μm.

11. The optical sheet according to claim 1, characterized in that convex portions are further provided on the other principal face side opposite to the one principal face on which said cylindrical lens elements are provided, and that

the average inclination gradient of the face on

the side on which said convex portions are provided is equal to or lower than 0.25.

12. A backlight, characterized in that said backlight comprises:

a light source for emitting illumination light; and

an optical sheet for raising the directivity of the illumination light emitted from said light source; that

said optical sheet has, on the illumination light emission side thereof,

cylindrical lens elements which have a high-order aspheric face and are provided successively in a row; and that,

where a Z axis is taken in parallel to a normal line direction to said optical sheet and an X axis is taken in a direction of the row of said cylindrical lens elements, a cross sectional shape of said cylindrical lenses satisfies the following expression:

$$Z = X^2/(R + \sqrt{(R^2 - (1 + K)X^2)}) + AX^4 + BX^5 + CX^6 + \cdots$$

(where R is the radius of curvature of a distal end vertex, K is a conic constant, and A, B, C, ⋯ are aspheric coefficients.)

13. A liquid crystal display apparatus, characterized in that said liquid crystal display apparatus comprises:

a light source for emitting illumination light;

an optical sheet for raising the directivity of the illumination light emitted from said backlight; and

a liquid crystal panel for displaying an image based on the illumination light emitted from said optical sheet; that

said optical sheet has, on the illumination light emission side thereof,

cylindrical lens elements which have a high-order aspheric face and are provided successively in a row; and that,

where a Z axis is taken in parallel to a normal line direction to said optical sheet and an X axis is taken in a direction of the row of said cylindrical lens elements, a cross sectional shape of said cylindrical lenses satisfies the following expression:

$$Z = X^2/(R + \sqrt{}(R^2 - (1 + K)X^2)) + AX^4 + BX^5 + CX^6 + \cdots$$

(where R is the radius of curvature of a distal end vertex, K is a conic constant, and A, B, C, ⋯ are aspheric coefficients.)